Transportation

Smart Growth integrates land use and transit systems at a regional scale without artificial jurisdictions. It focuses on moving people, not cars by regarding pedestrians, bicycle and car travel as equally important.

It locates mixed-use, high-density, walkable-scale development near public transportation systems, resulting in higher transit use and decreased reliance on private automobiles.

Smart Growth recommends traffic-calming measures that improve pedestrian and automotive safety. Transportation options that reduce reliance on cars such as access to public transportation, bike paths and pedestrian networks also promote livability while reducing pollution.

Case examples

- In the Long Island community of Wyandanch, Straight Path, a high-volume road that was the site of numerous accidents and several fatalities, was redesigned with traffic-calming measures that are part of a proposal for a mixed-use, commercial center that is pedestrian-friendly. (For more information, go to: http://www.sustainableli.org)

SMART TRANSPORTATION

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SMART GROWTH TRAINING SEMINAR

SPONSORED BY:

THE SUFFOLK COUNTY PLANNING FEDERATION
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HAUPPAUGE, NEW YORK

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ITE/NYSDOT DEFINITION OF TRAFFIC CALMING

TRAFFIC CALMING IS THE COMBINATION OF MAINLY PHYSICAL MEASURES THAT:

- REDUCE THE NEGATIVE EFFECTS OF MOTOR VEHICLE USE
  - CHANGING THE DESIGN AND ROLE OF THE STREET TO REDUCE NEGATIVE SOCIAL AND ENVIRONMENTAL EFFECTS OF MOTOR VEHICLES ON INDIVIDUALS (EX., SPEED, INTRUSION, ETC.) AND ON SOCIETY IN GENERAL (EX., POLLUTION, URBAN SPRAWL, ETC.)
- ALTER DRIVER BEHAVIOR
  - ADDRESSING SELF ENFORCEMENT ASPECTS BY LOWERING SPEEDS, REDUCING AGGRESSIVE DRIVING, AND INCREASING RESPECT FOR NON MOTORIZED STREET USERS
- IMPROVE CONDITIONS FOR NON MOTORIZED STREET USERS
  - PROMOTING WALKING AND CYCLING, INCREASING SAFETY, CREATING A FEELING OF SAFETY, AND IMPROVING AESTHETICS

TRAFFIC CALMING BACKGROUND

- TECHNIQUES ARE NOT NEW

- SOME HAVE BEEN USED SINCE DAYS OF HORSE DRAWN CARRIAGES

  - PEDESTRIAN REFUGE ISLANDS
  - TRAFFIC CIRCLES

- WHAT IS NEW IS THE INTEREST IN APPLYING THESE TECHNIQUES IN COMBINATION AND IMPROVING COMPATIBILITY AMONG ALL HIGHWAY USERS

  - RESIDENTIAL NEIGHBORHOOD TRAFFIC CALMING
  - SHOPPING OR ENTERTAINMENT ORIENTED STREETS
  - MAIN STREETS OF CITIES, VILLAGES AND HAMLETS
  - SCHOOL ZONES

TRAFFIC CALMING PROJECT OBJECTIVES

- IMPROVE DRIVER BEHAVIOR TO BE MORE CONSIDERATE OF OTHER USERS OF THE STREET OR ROAD
- INCREASE THE LEVEL OF RESPECT FOR NONMOTORIZED STREET USERS
- CREATE A FEELING OF SAFETY FOR ALL STREET USERS
- IMPROVE SAFETY AND CONVENIENCE FOR ROAD USERS, INCLUDING RESIDENTS, MOTORISTS, BICYCLISTS, PEDESTRIANS, TRANSIT RIDERS, AND PEOPLE WITH DISABILITIES
- REDUCE NUMBER AND/OR SEVERITY OF ACCIDENTS
- REDUCE NOISE AND AIR POLLUTION
- PROVIDE SPACE FOR NON-TRAFFIC ACTIVITIES (E.G., SHOPPING, REST, AND PLAY)
- ENHANCE STREET APPEARANCE AND REDUCE, WHERE POSSIBLE, THE NUMBER OF TRAFFIC SIGNS (TRAFFIC CONTROL MEASURES REQUIRE SIGNING AND MAY INCREASE THE NUMBER OF SIGNS)
- ACHIEVE AN OVERALL IMPROVEMENT IN THE ENVIRONMENT
- REDUCE SPEEDS OF MOTOR VEHICLES WHERE INCOMPATIBLE WITH ADJACENT LAND USE
- REDUCE NEED FOR POLICE ENFORCEMENT
- REDUCE SHORT-CUT MOTOR VEHICLE TRAFFIC
- MITIGATE THE IMPACT OF VEHICULAR TRAFFIC ON RESIDENTIAL NEIGHBORHOODS
- PROMOTE AND SUPPORT THE USE OF TRANSPORTATION ALTERNATIVES TO THE SINGLE OCCUPANT VEHICLE
- ACHIEVE AN OVERALL IMPROVEMENT OF THE COMMUNITY'S QUALITY OF LIFE

TRAFFIC CALMING MEASURES

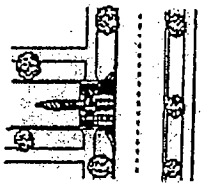
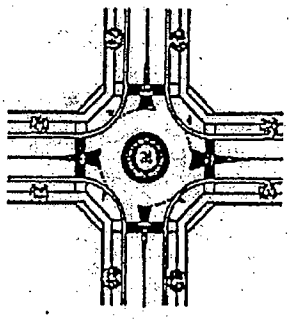
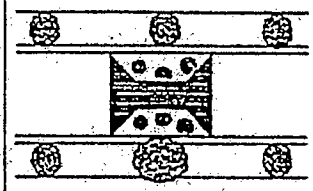
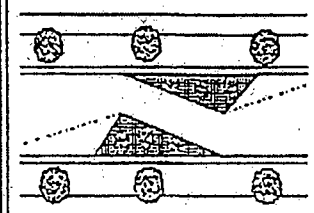
- HIGHER VISIBILITY CROSSWALKS
- NEIGHBORHOOD MEETING
- POLICE ENFORCEMENT
- POLICE PRESENCE
- POSTING 25 MPH SPEED LIMITS/RADAR WARNING SIGNS
- RADAR TRAILERS
- RUMBLE STRIPS
- STRIPING NARROWER LANES
- COMMERCIAL VEHICLE RESTRICTIONS
- NEIGHBORHOOD MONITORING PROGRAM
- STOP SIGN REVERSAL
- CHOKERS
- GATEWAYS
- INTERSECTION CHANNELIZATION
- MEDIAN BARRIER
- NECKDOWNS
- ONE WAY STREETS
- RAISED INTERSECTIONS
- ROUNDABOUTS
- SERPENTINE
- SINGLE LANE SLOW POINT
- SPEED HUMPS
- TURNING RESTRICTIONS USING DELINEATORS
- TWO LANE SLOW POINT
- CUL-DE-SAC
- DIAGONAL DIVERTER
- HALF CLOSURES
- MID BLOCK STREET CLOSURES
- PHOTO ENFORCEMENT

SPEED REDUCTION TECHNIQUES

- ROADWAY DESIGN TECHNIQUES
  - TRAFFIC CIRCLES
  - ROUNDABOUTS
  - CHICANES
  - ROADWAY NARROWING
  - SPEED HUMPS
- ROADWAY SURFACE TECHNIQUES
  - SPEED TABLES, RAISED INTERSECTIONS, AND SPEED CUSHIONS
  - RUMBLE STRIPS
- ENFORCEMENT TECHNIQUES
  - CONVENTIONAL ENFORCEMENT
  - SPEED TRAILERS
  - AUTOMATED ENFORCEMENT

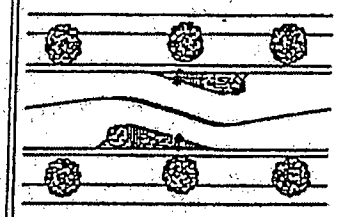
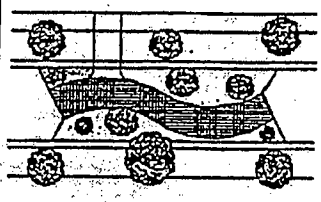
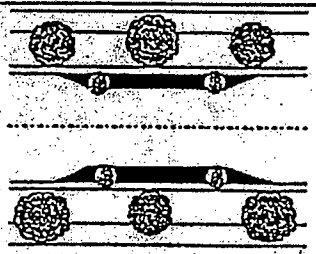
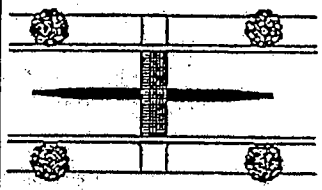
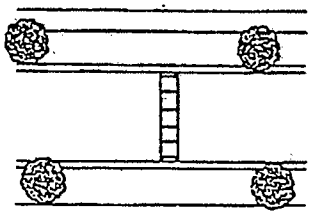
TRAFFIC CALMING ON LONG ISLAND

- TOWN OF ISLIP
  - MONTAUK HIGHWAY (ISLIP/BAY SHORE)
- TOWN OF HUNTINGTON
  - WATERSIDE ROAD
  - DALY ROAD
- VILLAGES OF SAG HARBOR AND NORTH HAVEN (ROUNDABOUTS)

DEVICE	ADVANTAGES	DISADVANTAGES
 1. Gateway treatments	Positive indication of a change in environment from arterial road to a residential street. Reduces entry speeds. Reduces pedestrian crossing distance. On very wide streets provides space for landscaping in the median.	Low speed of turning vehicles may restrict arterial road flow.
 2. Roundabouts	Reduces crashes by 50 to 90 percent when compared to two-way, four-way stop signs and traffic signals by reducing the number of conflict points at intersections. Reduces vehicle speeds. Provides space for landscaping. Cheaper to maintain than traffic signals. Effective at multi-leg intersections. Provides equal access to intersections for all drivers. Provides a good environment for cyclists.	May be restrictive for larger vehicles if designed to too low a speed. Providing a mountable apron this limitation can be minimized. May require additional lighting. If left turns by large vehicles are to be accommodated then right-of-way may have to be purchased.
 3. Single-lane slow point	Reduces vehicle speed. More effective when used in a series. Imposes minimal inconvenience to local traffic. Pedestrians have a reduced crossing distance and so have a safer crossing. Provides space for landscaping. Provides a visual obstruction.	Landscaping needs to be controlled to ensure visibility is reduced. Contrary to driver expectation of unobstructed flow. Can be hazardous for drivers and cyclists if not designed and maintained properly. Confrontation between opposing drivers arriving simultaneously could create problems.
 4. Single-lane angled slow point	As for (3).	As for (3).

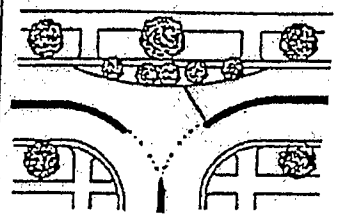
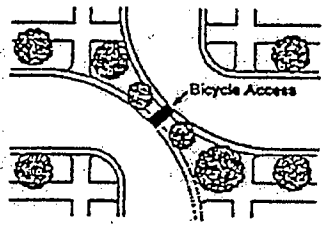
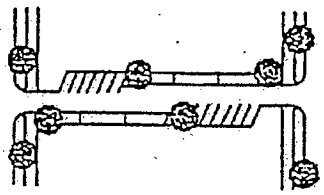
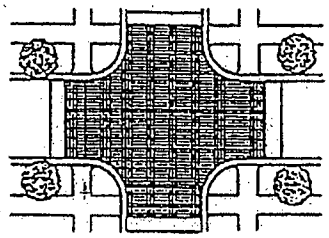
Traffic Calming - Advantages and Disadvantages

Source: *Florida Pedestrian Planning and Design Guidelines*, Florida Department of Transportation, May 1996.

DEVICE	ADVANTAGES	DISADVANTAGES
 5. Two-lane angled slow point	As for (3), except that pedestrian safety is less than (3).	As for (3). It is less effective in controlling speeds because drivers can create a straighter through movement by driving over centerline.
 6. Driveway link	As for (3). Provides a greater visual obstruction. Provides a large area for landscaping. Length of device is limited by cost. A very effective method of changing the initial impression of the street. If done right drivers will not be able to see through. Appears as a road closure yet allows through movements.	Increases the area of landscaping to be maintained by residents. Cost is greater than many other devices. Therefore better to be installed in conjunction with street reconstruction.
 7. Two-lane slow point	Causes only minor inconvenience to drivers. Regulates parking and serves to protect parked vehicles as the bulb-outs can be installed in no-parking areas to stop illegal parking. Reduces pedestrian crossing areas. Provides space for landscaping.	Not very effective in slowing vehicles or diverting through traffic. Only partially effective as a visual obstruction.
 8. Mid-block median	Provides a refuge for pedestrians and cyclists. Can improve the streetscape if landscaped.	Will only create a limited reduction in vehicle speeds.
 9. Speed bump	Reduces vehicle speeds in the vicinity of the bump. Better if used in a series at 300 to 500 feet spacing.	Creates noise particularly if there are lose items in vehicles or trailers. If not well designed drivers will put two wheels in the gutter to reduce impact. A harsh cheap solution. There are more effective and nicer treatments.

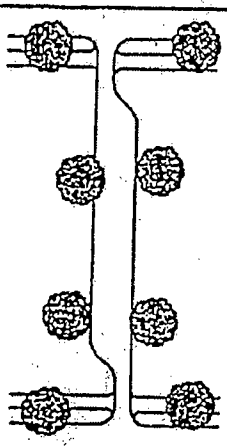
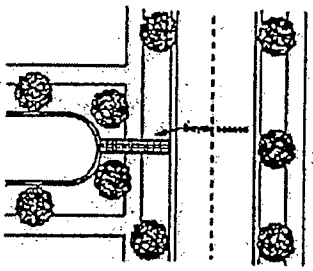
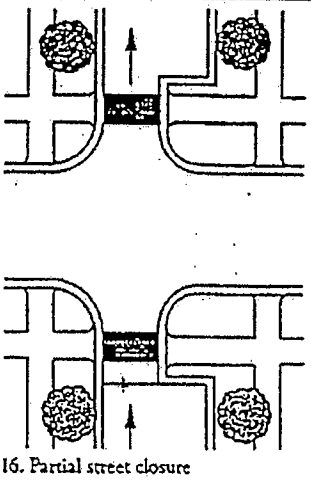
Traffic Calming - Advantages and Disadvantages

Source: *Florida Pedestrian Planning and Design Guidelines*, Florida Department of Transportation, May 1996.

DEVICE	ADVANTAGES	DISADVANTAGES
 10. Modified intersection	Reduces vehicle speeds. Reduces through traffic along the top of the Tee. Necessary to enforce changes in priority from one street to another.	Can be hazardous for vehicles and cause confusion regarding priority if incorrectly or inadequately designed.
 11. Diagonal road closure	Eliminates through traffic. Provides area for landscaping. Reduces conflicts. Increases pedestrian safety. Can include a bicycle pathway connection.	Will inconvenience residents in gaining access to their properties. May inhibit access by emergency vehicles unless the street names are changed. Will move through traffic to other streets if not back to the arterial.
 12. Shared zone	Provides a low speed shared environment that is safe for all users. Improves amenity without restricting access. Provides flexibility for on-street parking.	High cost unless part of original design.
 13. Intersection hump	Slows vehicles in the most critical area and so helps to make conflict avoidance easier. Highlights intersection.	Increases difficulty of making a turn.

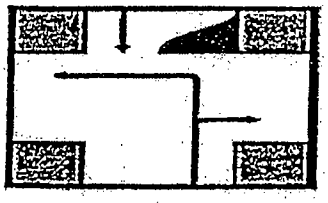
Traffic Calming - Advantages and Disadvantages

Source: *Florida Pedestrian Planning and Design Guidelines*, Florida Department of Transportation, May 1996.

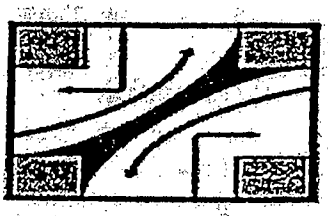
DEVICE	ADVANTAGES	DISADVANTAGES
 14. Modified street design	Reduces vehicle speeds without reducing access. Enhances amenity. Provides a large area for landscaping. Reduces the visual sight line.	High cost of retrofitting. Better as part of street reconstruction or initial construction.
 15. Street closure	Eliminates through traffic. Reduces the speed of the remaining vehicles. Improves safety for all other street users.	Reduces emergency vehicle access unless street is renamed. Reduces access to properties for residents.
 16. Partial street closure	Reduces through traffic in one direction and partially in the other. Allows two-way traffic in the remainder of the street.	Reduces access for residents. Emergency vehicles only partially affected as they have to drive around partial closure with some care.

Traffic Calming - Advantages and Disadvantages

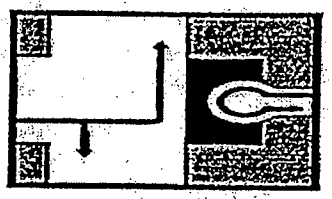
Source: *Florida Pedestrian Planning and Design Guidelines*, Florida Department of Transportation, May 1996.



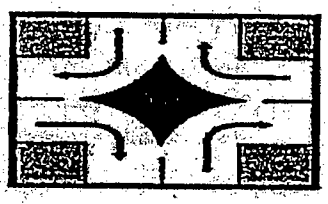
CURB BULB
Description: An extension of a curb built to block one half of the street.
Purpose: To stop vehicles from entering a neighborhood but allow egress.



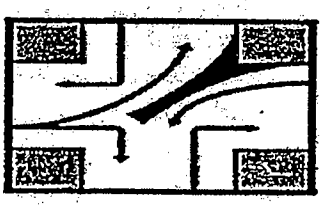
DIAGONAL DIVERTER
Description: An island built diagonally across an intersection.
Purpose: Discourages commuter traffic by forcing turns, returns streets to neighborhood/pedestrian use.



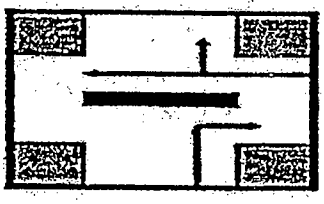
CUL-DE-SAC DIVERTER
Description: A complete street closure with a landscaped mini-park.
Purpose: To eliminate through traffic, separating land uses.



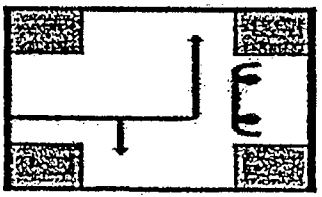
STAR DIVERTER
Description: A star-shaped island placed in an intersection.
Purpose: Discourages commuter traffic by forcing right turns.



TRUNCATED DIAGONAL DIVERTER
Description: A diagonal diverter with one end open.
Purpose: Discourages commuter traffic by forcing turns.



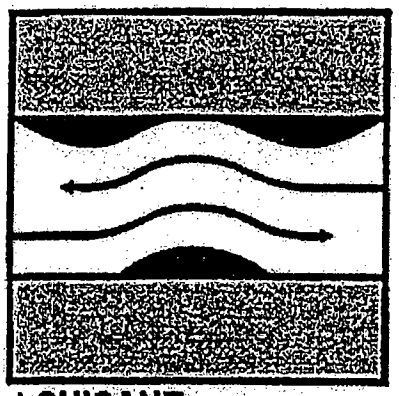
CHANNELIZATION CURB DIVERTER
Description: Six-inch high curbing placed along the center line of an arterial.
Purpose: To prevent left turns from an arterial to a residential street.



GUARDRAIL CLOSURE
Description: Steel or timber rails on posts to close a street.
Purpose: To eliminate through traffic.

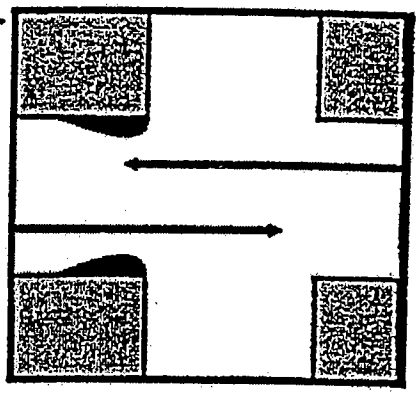
Types of Traffic Diverters Used for Neighborhood Traffic Control

Source: *Florida Pedestrian Planning and Design Guidelines*, Florida Department of Transportation, May 1996.



CHOKERS

Narrow the street to provide a visual distinction to a residential street, to slow traffic, to reduce pedestrian crossing distances, and improve safety.

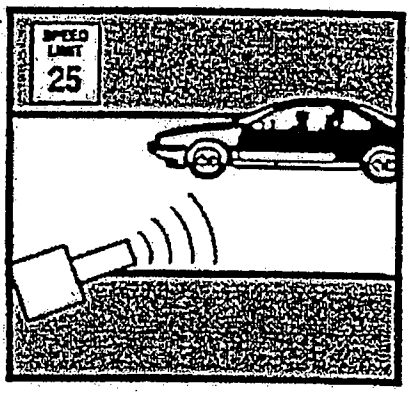


CHICANE

Curb bulbs off-set from each other in mid-block locations to reduce traffic speeds and improve safety. Can be used to keep trucks off neighborhood streets.

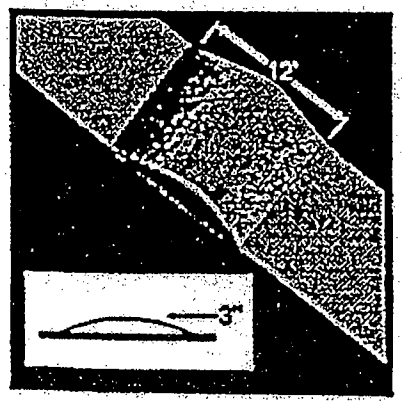
SPEEDWATCH PROGRAM

Authorize citizen's use of a radar gun to measure vehicle speed. In Seattle, official City letters of warning are sent to the registered owners of offending vehicles. Also involves City use of an electronic reader board and enforcement by the Seattle Police Department.



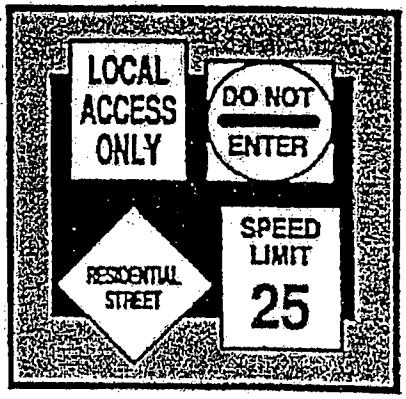
SPEED HUMP

Promotes smooth flow of traffic at slow speeds. Useful on residential streets to promote more acceptable operations within a neighborhood.



SIGNS

Signs (primarily regulatory) pavement markings, parking controls, traffic signals, turning controls, and enforcement.



Traffic Control Measures Used to Manage Traffic In Place

Source: *Florida Pedestrian Planning and Design Guidelines*, Florida Department of Transportation, May 1996.

Neighborhood Traffic Management and Calming Options

(Not in priority order)

Traffic Management Option	Speed Reduction	Volume Reduction/ Traffic Diversion	Noise Pollution	Loss of On-Street Parking	Access Restriction	Bus Route and Emergency Vehicle Response Impacts	Increase in Street Maintenance	Installation Cost
Higher Visibility Crosswalks	Possible	No	No Change	None	None	None	Yes	$1,000 to $5,000
Neighborhood Meeting	Possible	Possible	No Change	None	None	None	No	-
Police Enforcement	Yes	Possible	No Change	None	None	None	No	$90,000[1]
Police Presence	Possible	No	No Change	None	None	None	No	-
Posting 25 MPH Speed Limits/ Radar Warning Signs	Possible	No	No Change	None	None	None	No	$200 per sign
Radar Trailer	Yes	No	No Change	None	None	None	No	-
Rumble Strips	Yes	Possible	Yes (High)	None	None	None	Yes	$5,000
Striping Narrower Lanes	Yes	Possible	No Change	None	None	None	Yes	$1,000 to $3,000
Commercial Vehicle Restrictions	Possible	Yes	Yes	None	Yes	None	No	$1,000

Note: [1] For each additional officer and equipment.

Source: *Neighborhood Traffic Management and Calming Program*, City of San Buena Ventura (California) - Department of Community Services, June 1997.

Neighborhood Traffic Management and Calming Options

(Not in priority order)

Traffic Management Option	Speed Reduction	Volume Reduction/ Traffic Diversion	Noise Pollution	Loss of On-Street Parking	Access Restriction	Bus Route and Emergency Vehicle Response Impacts	Increase in Street Maintenance	Installation Cost
Neighborhood Monitoring Program	Yes	No	No Change	None	None	None	No	-
Stop Sign Reversal	Possible	No	Increase	None	None	None	No	$500
Chokers	Yes	Possible	No Change	Yes	None	Yes	No	$5,000 to $15,000
Gateways	Yes	Yes	Decrease	None	Yes	None	No	$5,000 to $15,000
Intersection Channelization	Yes	Possible	No	Yes	None	No	Possible	$30,000
Median Barrier	Possible	Yes	Decrease	None	Right Turn Only	Yes	No	$10,000 to $20,000
Neckdowns	Possible	Possible	No	Yes	None	Some Constraint	Yes	$10,000 to $20,000
One Way Streets	No	Yes	No Change	None	Yes	Yes	No	$1,000 to $5,000
Raised Intersections	Yes	No	Yes	Yes	None	Yes	Yes	$50,000 to $100,000
Roundabouts	Yes	Possible	No Change	Yes	None	Some Constraint	Yes	$10,000
Serpentine	Yes	Possible	Increase Possible	Yes	None	Yes	Possible	$50,000 to $75,000

Source: *Neighborhood Traffic Management and Calming Program*, City of San Buena Ventura (California) - Department of Community Services, June 1997.

Neighborhood Traffic Management and Calming Options

(Not in priority order)

Traffic Management Option	Speed Reduction	Volume Reduction/ Traffic Diversion	Noise Pollution	Loss of On-Street Parking	Access Restriction	Bus Route and Emergency Vehicle Response Impacts	Increase in Street Maintenance	Installation Cost
Single Lane Slow Point	Yes	Possible	Unknown	Yes	None	Yes	Yes	$5,000 to $15,000
Speed Humps	Yes	Yes	Increase	Yes	None	Yes	Yes[2]	$3,000 per hump
Turning Restrictions Uning Delineators	Possible	Yes	Decrease	None	Yes	Yes	Yes	$1,000
Two Lane Slow Point	Yes	Possible	Increase Possible	Yes	None	Some Problems	Possible	$40,000
Cul-De-Sac	Yes	Yes	Decrease	Yes	Total	Yes	No	$50,000
Diagonal Diverter	Yes	Yes	Decrease	Possible	Left or Right Turn Only	Yes	No	$15,000
Half Closures	Possible	Yes	No Change	Yes	Yes	Yes	No	$15,000
Mid Block Street Closures	Yes	Yes	Decrease	Yes	Yes	Yes	Yes	$50,000
Photo Enforcement	Yes	No	No	No	None	None	No	$165,000[3]

Note: [2] Speed humps have to be reinstalled each time a street is resurfaced.

[3] Initial start up cost for citywide program. Ongoing costs are approximately $85,000/year.

Source: *Neighborhood Traffic Management and Calming Program*, City of San Buena Ventura (California) - Department of Community Services, June 1997.

THINGS TO LOOK FOR IN A TRAFFIC IMPACT STUDY

1. ARE THE INTERSECTIONS CHOSEN FOR ANALYSIS THE CRITICAL INTERSECTIONS IN CLOSE PROXIMITY OF THE PROJECT? FOR ROUTINE PROJECTS, ANALYSIS OF THE SIGNALIZED INTERSECTIONS ON EITHER SIDE OF THE SITE ACCESS WOULD BE APPROPRIATE.

2. ARE VOLUME AND TURNING MOVEMENT COUNTS RECENT (I.E. 24 MONTHS OR LESS OLD)?

3. DOES THE HCM ANALYSIS OF THE EXISTING CONDITIONS AT THE STUDY INTERSECTIONS REPLICATE ACTUAL CONDITIONS?

4. THE NO BUILD SCENARIO

   A. IS THE BUILD YEAR A REALISTIC MEASURE OF THE TIME IT WILL TAKE TO GET APPROVALS?
   B. IS THE GROWTH FACTOR FOR TRAFFIC VOLUMES FROM A RELIABLE SOURCE (I.E. NYSDOT OR COUNTY DPW)?
   C. IS THE TRAFFIC FROM OTHER DEVELOPMENTS <u>APPROVED</u> BY THE TOWN INCLUDED IN THE NO BUILD ANALYSIS?

5. SITE GENERATED TRAFFIC FOR THE PROJECT SHOULD BE CALCULATED FROM THE LATEST EDITION OF THE INSTITUTE OF TRANSPORTATION ENGINEERS REFERENCE BOOK "<u>TRIP GENERATION</u>", PROVIDED THAT SUFFICIENT DATA IS AVAILABLE. IF NOT, THEN LOCAL COUNTS OF SIMILAR USES SHOULD BE USED.

6. PASS-BY CREDITS FOR RETAIL USES ARE ACCEPTABLE, GENERALLY 25% FOR WEEKDAY TRIPS AND 20% FOR WEEKEND TRIPS. SPECIAL USES SUCH AS FAST FOOD RESTAURANTS, GAS STATIONS, AND CONVENIENCE STORES HAVE HIGHER RATES. SPECIAL RETAIL USES (HOME DEPOT, WHOLESALE CLUBS) MAY HAVE LOWER PASS-BY RATES.

7. TRIP DISTRIBUTION AND ASSIGNMENT. FOR SMALLER PROJECTS WITH A DRAW OF 5 MILES OR LESS, EXISTING TRAFFIC PATTERNS ARE MOST LIKELY THE BEST INDICATOR PARTICULARLY WITH USES WITH HIGH PASS-BY RATES. FOR OFFICE/INDUSTRIAL AND OTHER EMPLOYEE BASED TRIPS, "JOURNEY TO WORK" AND/OR CENSUS DATA IS THE BEST INDICATOR OF POTENTIAL TRIP PATTERNS. FOR LARGE RETAIL USES, WEIGHTED POPULATION DISTRIBUTION WOULD BE AN APPROPRIATE TECHNIQUE.

8. THE BUILD ANALYSIS IS THEN CALCULATED USING THE SAME METHODOLOGY AS THE NO BUILD ANALYSIS AND COMPARED. THIS SHOULD BE DONE BY OVERALL INTERSECTION PERFORMANCE AND BY INDIVIDUAL LANE GROUP PER INDIVIDUAL APPROACH. LEVEL OF SERVICE (LOS) AND VOLUME TO CAPACITY (V/C) ARE BOTH IMPORTANT FACTORS.

9. WHEN LOOKING AT IMPACTS, DO NOT CONCENTRATE ON LOS CHANGES. SOMETIMES SMALL INSIGNIFICANT CHANGES IN DELAY CAUSE LOS CHANGES WHICH ARE NOT REALISTICALLY SIGNIFICANT. LOOK FOR THE MAGNITUDE OF CHANGE IN DELAY AND V/C.

10. DOES THE PROPOSED MITIGATION MINIMIZE THE IMPACT AND IS IT REALISTIC? ARE THERE ANY OTHER PRACTICAL ALTERNATIVES TO THE PROPOSED MITIGATION?

MITIGATION OPTIONS

- ON-SITE
  - CURB CUT CHANGES
  - SHARED ACCESS, SHARED PARKING, AND PAVING RELAXATIONS (LANDBANKING)
  - CROSS EASEMENTS FOR VEHICLES
  - PEDESTRIAN CONNECTIONS WITHIN SITE AND BETWEEN PROPERTIES
- OFF-SITE
  - IMPROVEMENTS BY DEVELOPER AS CONDITIONS OF APPROVAL (C.O., BONDING, ETC.)
    -- TRAFFIC SIGNALS, RESTRIPING, ADDITIONAL CAPACITY
  - MITIGATION FEE
  - ECONOMIC MITIGATION
  - SPECIAL ASSESSMENT IMPROVEMENT DISTRICTS